FOSSILS IN THE SAN FRANCISCO BAY REGION
FITZGERALD MARINE PRESERVE, SAN MATEO COUNTY

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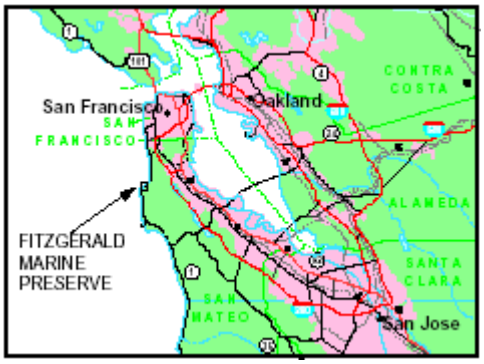

Fig. 1.--Index map of the San Francisco Bay area showing the location of the Fitzgerald Marine Preserve.

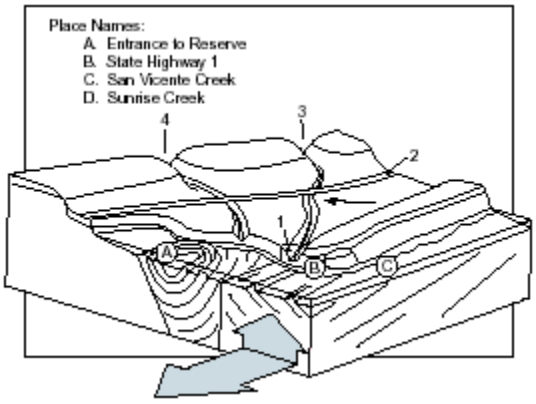

Fig. 2.--View facing southeast from over the ocean of geologic features and fossil sites. A) is the upper Purisima Formation, B) is the lower Purisima Formation, and C) is from terrace deposits.

Many times in the geological past, the San Francisco Bay area has been partially or wholly beneath the sea. Fossils and evidence of fossils from three such periods can be observed by taking a field trip to the Fitzgerald Marine Preserve (http://www.sfgate.com/getoutside/1996/jun/fitz.html) in San Mateo County. To get to the Fitzgerald Marine Preserve from San Francisco, take Highway 1 south to Moss Beach and turn right on California Street. At the end of California Street, turn right into the parking lot of the Marine Preserve. From the Peninsula, take Highway 92 west to Half Moon Bay, and then drive north on Highway 1. Turn left at California Street and park in the lot at the end of the street on the right. From the South Bay/Santa Cruz area, take Highway 1 north to Moss Beach and follow the directions for coming from the Peninsula.

The Fitzgerald Marine Preserved is a protected area and no collecting is allowed. There is also a danger of slides from the bluff face. Please be careful.

Many of the fossils at the Preserve can only be observed during low tide, so check a tide table and plan accordingly. When you get to the Preserve take the main path down to the beach. From the end of the path above the beach there are three areas where you can look for fossils, 1) to the right in the intertidal zone (the zone in the Ocean between high tide and low tide); 2) to the left in the intertidal zone up to the bluffs; and 3) along the front of the bluffs to the left of the path down to the beach. On your right (north; Fig. 2, A), in the intertidal zone you'll see layers of rock which form a stacked set of bowls that have been sliced in two. This is called a syncline. Some of the layers are composed of large well-rounded cobbles and pebbles, but fossils of shallow water animals can also be found in

these beds. These layers of sandstone and conglomerate and their enclosed marine fossils are from the Purisima Formation. Formations are artificial groupings of similar rocks.

Fossils mollusks (http://geology.er.usgs.gov/paleo/mollusks.shtml) from these beds once lived at shallow water depths, probably between the intertidal zone and 10 m, in a climate similar to today, or possibly slightly cooler. Paleontologists interpret the environment in which these fossils lived by assuming that they inhabited a similar environment (water depths and temperatures) in the past as they do today. These rocks have been dated from the late Pliocene and are between 2 and 4 million years old. On your left (south; Fig. 2, B) from the intertidal zone up to the base of the sea cliffs you'll see thinly bedded to massive (the rocks are all the same and no bedding is observable) rocks. You have crossed part of the San Gregorio fault and are standing on rocks older than those in the intertidal zone to the north. Within these beds you can find bones from marine mammals and rare mollusk fossils. Foraminifers, microscopic single-celled organisms that live in the world's oceans, (http://geology.er.usgs.gov/paleo/forams_b.shtml), and mollusks from these beds suggest much deeper water depths than those across the fault, probably between 100 and 700 m. Also, these rocks have been tentatively dated at between 3 and 5 million years old and are older than those exposed across the fault. The third fossil site is along the base of the cliffs south of the path from the parking lot (Fig. 2, C). If you look at the sea cliff, you will see rocks similar to what you're standing on going up for perhaps 10 or 12 feet. On top of that you'll see sandy sediments containing large rounded boulders. This is a marine terrace. Some of these rocks have fallen down by your feet. They are very distinctive, as they are full of round cavities and holes. They are not body fossils but the evidence of fossils (called ichnofossils) from a period only a hundred thousand years old. Marine clams drilled into the rocks and made these rounded cavities spending their lives.

Look around, have fun, and please remember, no collecting.

Selected reading:

General audience

Perry, Frank A., 1977, Fossils of Santa Cruz County [California]: Santa Cruz Museum Association. Santa Cruz, Calif., 32 p., illus.

_____, 1993, Fossil invertebrates of the marine cliffs at Capitola, California: Santa Cruz Museum Association. Santa Cruz, Calif., 30 p., illus.

Advanced audience

Addicott, Warren O., Barron, John A., and Miller, John W., 1978, Marine late Neogene sequences near Santa Cruz, California, In Addicott, W.O., ed., Neogene biostratigraphy of selected areas in the California Coast Range: For field conference on the marine Neogene of California, International Geological correlation programme (IGCP) Project 114. U. S. Geological Survey Open-file Report 78-446, p. 97-107.

Glen, William, 1959, Pliocene and lower Pleistocene of the western part of the San Francisco Peninsula: University of California Publications in Geological Sciences, v. 36, no. 2, p. 147-198.

Powell, Charles L., II, 1998, The Purisima Formation and related rocks (upper Miocene – Pliocene), greater San Francisco Bay area, central California. Review of literature and USGS collections (now housed at the Museum of Paleontology, University of California, Berkeley): U. S. Geological Surve y Open-file Report 98-594, 101 p., (http://wrgis.wr.usgs.gov/open-file/of98-594/)

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